



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/518,563	12/20/2004	Motoshi Kawamura	F-8489	8396
28107 7590 08/06/2007 JORDAN AND HAMBURG LLP 122 EAST 42ND STREET SUITE 4000 NEW YORK, NY 10168			EXAMINER PILKINGTON, JAMES	
			ART UNIT 3682	PAPER NUMBER
			MAIL DATE 08/06/2007	DELIVERY MODE PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/518,563

Applicant(s)

KAWAMURA ET AL.

Examiner

James Pilkington

Art Unit

3682

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 May 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7 is/are pending in the application.
- 4a) Of the above claim(s) 4, 6 and 7 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-3 and 5 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 12/20/04 & 6/04/07.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Election/Restrictions

1. Applicant's election with traverse of Group VII corresponding to Figure 12 in the reply filed on May 25, 2007 is acknowledged.

Claims 6 and 7 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in the reply filed on May 25, 2007.

The traversal is on the ground(s) that the present application is a National Stage PCT Application filed under 35 USC §371 and that election of an invention is not required where a unity of invention exists among the claims. This is not found persuasive because the applicant has not submitted evidence showing that the species are obvious variants or clearly admitted on the record that this is the case as required in the restriction requirement dated April 20, 2007 (page 3).

The requirement is still deemed proper and is therefore made FINAL.

2. Claim 4 is also being withdrawn from consideration for being drawn to a nonelected species. The elected species corresponding to Figure 12 discloses an arrangement using two tandem ball bearings. Claim 4 requires a circular cone rolling bearing with a single raceway that is not shown in the elected species of Figure 12.

Priority

Art Unit: 3682

3. The Applicant's claim to priority of PCT/JP03/15854 filed December 11, 2003 is acknowledged.

Claim Objections

4. Claim 5 is objected to because of the following informalities:

- Line 2 reads "the pinion shaft side" should be - - the pinion side of the pinion shaft- -
- Line 3 reads "includes the tandem type" should be - - includes a tandem type"

Appropriate correction is required.

Claim Rejections - 35 USC § 103

5. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

6. Claims 1, 3 and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over Jacob, DE19839481 (see US PGPub 2004/0173042 for English equivalent), in view of Yasuto, JP63167116.

Regarding claim 1, Jacob discloses a bearing apparatus for supporting a pinion shaft comprising:

- A pair of rolling bearings (16 and 17) which rotatably support a pinion shaft (5) to a case (1) and are arranged side by side in a shaft direction (along the shaft 5) between a pinion gear (4) arranged at one end of said pinion

Art Unit: 3682

shaft (5) and a companion flange (11) attached outside the other end thereof,

- Wherein the rolling bearing (17) on the companion flange side (11) comprises an angular ball bearing comprising an inner ring (18) fixed to said pinion shaft (5), an outer ring (19) fixed to said case (1), and a set of balls (23) interposed between these inner and outer rings (18 and 19)

Jacob does not disclose a relationship between a radius of curvature R_i of the inner ring raceway, radius of curvature R_o of an outer ring raceway, and a ball diameter B_d of the rolling bearing that satisfies: $R_i < R_o$, $0.502B_d \leq R_i \leq 0.512B_d$ and $0.510B_d \leq R_o \leq 0.520B_d$.

Yasuto teaches a relationship between a radius of curvature R_i of the inner ring raceway, radius of curvature R_o of an outer ring raceway, and a ball diameter B_d (d) of the rolling bearing that satisfies: $R_i < R_o$, $0.502B_d \leq R_i \leq 0.512B_d$ and $0.510B_d \leq R_o \leq 0.520B_d$. Yasuto explicitly discloses that R_i is between $0.501d$ and $0.509d$ and that R_o is between $0.501d$ and $0.519d$ which meets the limitation $R_i < R_o$.

All of the structural limitations are known in Jacob and Yasuto. The only difference is the combination of the "old elements" into a single device by mounting the particular bearing races to the pinion shaft of Jacob. Thus, it would have been obvious to one having ordinary skill in the art to mount the races taught by Yasuto onto the shaft of Jacob. The resulting combination would yield predictable results of preventing slippage of the ball bearings.

Regarding claim 3, Jacob discloses that the rolling bearing (17) on the companion flange side (11) includes a tandem type angular contact ball bearing with double raceway (see Figure 2).

Regarding claim 5, Jacob disclose that the rolling bearing (16) on the pinion side (4) of the pinion shaft (5) includes a tandem type angular contact ball bearing with double raceway (see Figure 2).

7. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Jacob, DE19839481 (see US PGPub 2004/0173042 for English equivalent), in view of Yasuto, JP63167116 as applied to claim 1 above and further in view of Eklund, USP 3,370,899.

Jacob in view of Yasuto does not disclose a contact angle θ between the ball and the inner and outer ring raceways in the rolling bearing on the companion flange side satisfies $30 \leq \theta \leq 45$.

Eklund teaches a contact angle between the ball (14) and the inner and outer ring raceways (11 and 12) in a rolling bearing that satisfies $30 \leq \theta \leq 45$ (Eklund explicitly discloses two contact angles 36 and $37\frac{1}{2}$).

All of the structural limitations are known in Jacob, Yasuto and Eklund. The only difference is the combination of the "old elements" into a single device by adding contact angles in the range of $30 \leq \theta \leq 45$ in to the combination of Jacob in view of Yasuto. Thus, it would have been obvious to one having ordinary skill in the art to add contact angles within this range as taught by Yasuto onto the raceways of Jacob in view of

Art Unit: 3682

Yasuto. The resulting combination would yield predictable results of preventing ball windup.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James Pilkington whose telephone number is (571) 272-5052. The examiner can normally be reached on Monday-Friday 8:00AM-4:00PM.


If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on (571) 272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JP

JP

7/31/07


Thomas R. Hannon
Primary Examiner